IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Brock Estel Osborn et al.	§	
	§	Group Art Unit: 2123
Serial No.: 09/897,556	§	
	§	Examiner: Thangavelu, Kandasamy
Filed: July 3, 2001	§	
	§	
For: INTERACTIVE GRAPHICS-BASED ANALYSIS TOOL FOR VISUALIZING RELIABILITY OF A SYSTEM AND PERFORMING RELIABILITY ANALYSIS THEREON	§	Atty. Docket: RD27987-1/YOD GERD:0501

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APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on July 3, 2006, and received by the Patent Office on July 10, 2006.

The Commissioner is authorized to charge the requisite fee of $500.00, and any additional fees which may be necessary to advance prosecution of the present application, to Account No. 07-0868, Order No. RD27987-1/YOD (GERD:0501).

1. REAL PARTY IN INTEREST

The real party in interest is General Electric Company, the Assignee of the above-referenced application by virtue of the Assignment to General Electric Company by Carl Harold Hansen, Melvin Craig Edgar Jr., James Earnest Dockendorff, Donald Lee Gardner, Brock Estel Osborn, John Erik Hershey, Radu Eugen Neagu, Alissa Beth

Krupar, and Kati Illouz recorded at reel 012040, frame 0390, and dated July 3, 2001. Accordingly, General Electric Company, as the parent company of the Assignee of the above-referenced application, will be directly affected by the Board's decision in the pending appeal.

2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. STATUS OF CLAIMS

Claims 1-4, 12-28, 36-46, 48-53 and 55-57 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal.

4. STATUS OF AMENDMENTS

Appellants have not submitted any amendments subsequent to the Final Office Action mailed on May 8, 2006. Consequently, there are no outstanding amendments to be considered by the Board.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates generally to improving quality of products and systems. *See,* Application, paragraph 1. More particularly, in certain embodiments, the invention relates to providing an interactive graphics-based tool for visualizing the reliability associated with complex systems as well as performing various types of reliability analysis on such systems. *See, id.*

The Application contains 11 independent claims, namely, claims 1, 12, 16, 19, 25, 36, 39, 43, 50, 55 and 56, all of which are the subject of this Appeal. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to an interactive graphics-based system (*e.g.*, 10) for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The interactive graphics-based system (*e.g.*, 10) includes a processor (*e.g.*, 12) for executing instructions, a memory (*e.g.*, 14) for storing instructions and data, a display device (*e.g.*, 22), and an interactive graphics-based tool (*e.g.*, 28). *See, e.g., id.*, paragraphs 31-33; *see also,* FIG. 1 and FIG. 2. The interactive graphics-based tool (*e.g.*, 28) includes a hierarchical representation component (*e.g.*, 30) that organizes the system and the plurality of subsystems and components into a hierarchical representation, an interactive selection component (*e.g.*, 32) that provides a plurality of options for analyzing the hierarchical representation, a reliability analysis component (*e.g.*, 34) responsive to the hierarchical representation component and the interactive selection component and configured to perform a reliability analysis at any level of the hierarchical representation, and a visualization component (*e.g.*, 36) that provides a movie mode display of the reliability analysis. *See, e.g., id.*, paragraphs 34 and 38-41; *see also,* FIG. 2.

With regard to the aspect of the invention set forth in independent claim 12, discussions of the recited features of claim 12 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a graphics-based system (*e.g.*, 10) for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The graphics-based system (*e.g.*, 10) includes a processor (*e.g.*, 12) for executing instructions, a memory (*e.g.*, 14) for storing instructions and data, a display device (*e.g.*, 22), and a graphics-based tool (*e.g.*, 28). *See, e.g., id.*, paragraphs 31-33; *see also,* FIG. 1 and FIG. 2. The graphics-based tool (*e.g.*, 28) includes means (*e.g.*, 30) for organizing the system and the plurality of subsystems and components into a hierarchical representation, means for (*e.g.*, 32)

providing a plurality of options for analyzing the hierarchical representation, means (*e.g.*, 34), responsive to the organizing means and the providing means, for performing a reliability analysis at any level of the hierarchical representation, and means for (*e.g.*, 36) generating a visualization of the reliability analysis in a movie mode display. *See, e.g., id.*, paragraphs 34 and 38-41; *see also,* FIG. 2.

With regard to the aspect of the invention set forth in independent claim 16, discussions of the recited features of claim 16 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a system (*e.g.*, 10, 336, 350, 362) for performing an analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The system (*e.g.*, 10, 336, 350, 362) includes a processor (*e.g.*, 12) for executing instructions, a memory (*e.g.*, 14) for storing instructions and data, a display device (*e.g.*, 22), a data repository (*e.g.*, 348, 352) containing a plurality of service data for the system, an interactive data preprocessor (*e.g.*, 354) that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection, and an interactive graphics-based tool (*e.g.*, 28) for performing the user specified reliability analysis on the system in accordance with the plurality of service data. *See, e.g., id.*, paragraphs 31-33, 88, 90-91, and 94; *see also,* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21. The interactive graphics-based tool (*e.g.*, 28) includes a hierarchical representation component (*e.g.*, 30) that organizes the system and the plurality of subsystems and components into a hierarchical representation, an interactive selection component (*e.g.*, 32) that provides a plurality of options for analyzing the hierarchical representation, a statistical analysis component (*e.g.*, 34) responsive to the hierarchical representation component and the interactive selection component and configured to perform a statistical analysis at any level of the hierarchical representation, and a visualization component (*e.g.*, 36) that provides a movie mode display of the statistical analysis. *See, e.g., id.*, paragraphs 34 and 38-41; *see also,* FIG. 2.

With regard to the aspect of the invention set forth in independent claim 19, discussions of the recited features of claim 19 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a system (*e.g.*, 10, 336, 350, 362) for performing an analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The system (*e.g.*, 10, 336, 350, 362) includes a data repository (*e.g.*, 348, 352) containing a plurality of service data for the system, an interactive graphics-based tool (*e.g.*, 28) for performing a statistical analysis on the system in accordance with the plurality of service data, and a first computing unit (*e.g.*, 344) configured to serve the data repository (*e.g.*, 348, 352) and the interactive graphics-based tool (*e.g.*, 28). *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, and 94; *see also,* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21. The interactive graphics based tools (*e.g.*, 28) include a hierarchical representation component (*e.g.*, 30) that organizes the system and the plurality of subsystems and components into a hierarchical representation, an interactive selection component (*e.g.*, 32) that provides a plurality of options for analyzing the hierarchical representation, a statistical analysis component (*e.g.*, 34) responsive to the hierarchical representation component and the interactive selection component and configured to perform a statistical analysis at any level of the hierarchical representation and a visualization component (*e.g.*, 36) that provides a movie mode display of the statistical analysis. *See, e.g., id.*, paragraphs 34 and 38-41; *see also,* FIG. 2.

With regard to the aspect of the invention set forth in independent claim 25, discussions of the recited features of claim 25 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer-implemented method for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, and 94; *see also,* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21. The computer-implemented method includes the steps of organizing the system and the plurality of

subsystems and components into a hierarchical representation, providing a plurality of options for analyzing the hierarchical representation, performing a reliability analysis at any level of the hierarchical representation, and providing a visualization of the reliability analysis as a movie mode display. *See, e.g., id.*, paragraphs 34 and 38-41; *see also,* FIG. 2.

With regard to the aspect of the invention set forth in independent claim 36, discussions of the recited features of claim 36 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer-implemented method for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The computer-implemented method includes the steps of storing a plurality of service data for the system, preprocessing the plurality of service data in accordance with a user specified reliability analysis selection, providing an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data, and providing a visualization of the reliability analysis as a movie mode display. The interactive graphics-based tool is configured to organize the system and the plurality of subsystems and components into a hierarchical representation, to provide a plurality of options for analyzing the hierarchical representation, and to perform a reliability analysis at any level of hierarchical representation. *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, and 94; *see also,* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21, and paragraphs 34 and 38-41.

With regard to the aspect of the invention set forth in independent claim 39, discussions of the recited features of claim 39 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer-implemented method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The computer-implemented method includes the steps of prompting the user to organize the system and

the plurality of subsystems and components into a hierarchical representation, prompting the user to select from a plurality of analyzing options, performing a reliability analysis at any level of the hierarchical representation in response to the user selection, and providing a visualization of the reliability analysis to the user in a movie mode display. *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, and 94; *see also* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21, and paragraphs 34 and 38-41.

With regard to the aspect of the invention set forth in independent claim 43, discussions of the recited features of claim 43 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer-implemented method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The computer-implemented method includes the steps of storing a plurality of service data for the system, prompting the user to specify a reliability analysis selection, preprocessing the plurality of service data in accordance with the user specified reliability analysis selection, performing the user specified reliability analysis, and providing a visualization of the reliability analysis as a movie mode display. *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, and 94; *see also* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21, and paragraphs 34 and 38-41.

With regard to the aspect of the invention set forth in independent claim 50, discussions of the recited features of claim 50 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer-readable medium (*e.g.*, 14) storing computer instructions which when executed on a computer (*e.g.*, 10) perform a process for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, 94, and 97-98; *see also* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21. The computer instructions implements computer processing for organizing the system and the

plurality of subsystems and components into a hierarchical representation, providing a plurality of options for analyzing the hierarchical representation, performing a reliability analysis at any level of the hierarchical representation, and visualizing the reliability analysis in a movie mode display. *See, e.g., id.*, paragraphs 34 and 38-41; *see also,* FIG. 2.

With regard to the aspect of the invention set forth in independent claim 55, discussions of the recited features of claim 55 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer-readable medium (*e.g.*, 14) storing computer instructions which when executed on a computer perform a process for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The computer instructions implements computer processing for prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation, prompting the user to select from a plurality of analyzing options, in response to the user selection, performing a reliability analysis at any level of the hierarchical representation, and providing a visualization of the reliability analysis to the user in a movie mode display. *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, 94, and 97-98; *see also* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21, and paragraphs 34 and 38-41.

With regard to the aspect of the invention set forth in independent claim 56, discussions of the recited features of claim 56 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer-readable medium (*e.g.*, 14) storing computer instructions which when executed on a computer perform a process for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem. The computer instructions implements computer processing for storing a plurality of service data for the system, prompting the user to specify a reliability analysis selection, preprocessing the

plurality of service data in accordance with the user specified reliability analysis selection, performing the user specified reliability analysis, and providing a visualization of the reliability analysis as a movie mode display. *See, e.g., id.*, paragraphs 31-33, 86, 88, 90-91, 94, and 97-98; *see also* FIG. 1, FIG. 2, FIG. 19, FIG. 20, and FIG. 21, and paragraphs 34 and 38-41.

A benefit of the invention, as recited in these claims, is the ability to use the interactive graphics-based reliability analysis tool to characterize the reliability of a complex system at all levels and subsequently use the reliability characterization to predict the rate at which a system (i.e., subsystem and/or components) will fail, determine the cost of the system over its entire life span, forecast risk for long term service agreement pricing and monitoring of the system. Further it should be noted that such reliability characterization can be used to perform additional functions other than the ones listed above such as comparing the fits of various alternative statistical reliability models, identifying which components in the system have the largest impact on system level reliability, etc. *See, e.g., id.*, paragraphs 33 and 92.

This is a clear difference and distinction from the prior art, as discussed below.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

First Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's first ground of rejection in which the Examiner rejected claims 1-3, 12-14, 25-27, 39-41, 50-52 and 55 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby et al., U.S. Patent No. 6,549,880 (hereinafter "Willoughby") in view of Weinstock et al., U.S. Patent No. 6,223,143 (hereinafter "Weinstock") and further in view of Goyal et al., U.S. Patent No. 5,625,575 (hereinafter "Goyal").

Second Ground of Rejection for Review on Appeal:

The Examiner rejected claims 4, 15, 19-22, 24, 28, 42 and 53 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Weinstock and Goyal and further in view of Spira et al., U.S. Patent Application No. 2003/0172002 (hereinafter "Spira"). Appellants respectfully urge the Board to review and reverse the Examiner's second ground of rejection.

Third Ground of Rejection for Review on Appeal:

The Examiner rejected claims 16, 17, 23, 36, 38, 44-46, 48, 49 and 57 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Spira, Wegerich et al., U.S. Patent Application No. 2003/0183971 (hereinafter "Wegerich"), and Weinstock and further in view of Goyal. Appellants respectfully urge the Board to review and reverse the Examiner's third ground of rejection.

Fourth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's fourth ground of rejection in which the Examiner rejected claims 18 and 37 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Weinstock and further in view of Spira, Wegerich, Goyal, Gross et al., U.S. Patent No. 5,774,379 (hereinafter "Gross") and Cook, U.S. Patent No. 6,546,378.

Fifth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's fifth ground of rejection in which the Examiner rejected claims 43 and 56 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Spira and further in view of Wegerich and Goyal.

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents

and principles in rejecting the claims under Section 103. Accordingly, Appellants respectfully request full and favorable consideration by the Board, and reversal of the outstanding rejections. Appellants strongly believe that claims 1-4, 12-28, 36-46, 48-53 and 55-57 are currently in condition for allowance.

A. **Ground of Rejection No. 1:**

The Examiner rejected claims 1-3, 12-14, 25-27, 39-41, 50-52 and 55 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Weinstock and Goyal. Appellants respectfully traverse this rejection.

Claims 1, 12, 25, 39, 50 and 55 and the Claims Depending Therefrom.

The Examiner rejected each of the independent claims 1, 12, 25, 39, 50 and 55 under 35 U.S.C. §103(a) as being unpatentable over Willoughby in view of Weinstock and Goyal. Appellants respectfully traverse this rejection. The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes all of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985).

Goyal fails to teach, disclose or suggest any reliability analysis or any movie mode display of the reliability analysis.

Contrary to the cited caselaw, the Examiner failed to apply combinations of references that include *all* of the recited features of claims 1, 12, 25, 39, 50 and 55. Appellants respectfully assert that the present invention, as recited in independent claims

1, 12, 25, 39, 50 and 55 is patentable over the cited references alone or in combination. Each independent claim recites, in generally similar language, *movie mode display of the reliability analysis*. The Examiner stated that Goyal "teaches a visualization component that provides movie mode display of the reliability analysis". Office Action, page 4; citing Goyal at column 1, lines 8-9; column 14, lines 1-4; column 30, lines 17-26; and column 31, lines 40-45. Appellants respectfully submit that Goyal does not describe *any reliability analysis whatsoever*. Goyal does nothing but suggest the use of movie playback mode for displaying parts. However, it is *not* known in the art to present reliability analysis in movie mode. None of the other references teaches such display of reliability analysis, and indeed the Examiner does not suggest as much. Thus, even if combined, the reference would not teach all of the recitations of the claims, particularly the movie mode display of reliability analysis.

Willoughby, Weinstock and Goyal cannot be fairly combined as suggested by the Examiner.

Further, the Appellants respectfully submit that the references *cannot be fairly combined* because Goyal does not describe any reliability analysis whatsoever. One skilled in the art will not be motivated to use the movie mode display of mechanism parts as described in Goyal to present the reliability analysis in movie mode. There is no suggestion to combine the cited reference absent the present application. The only possible suggestion the Examiner can find is from the Application itself. It is not the Appellants' intention to view the references individually, but to argue that the references cannot be combined or, at the very least, that there is no motivation in the art for doing so.

When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One

cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). Appellants respectfully submit that none of the references suggests the combination relied upon by the Examiner or a motivation for such a combination. Accordingly, Appellants believe that the combination is not obvious to one skilled in the art and that the Examiner is using hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

The Examiner argued that Goyal teaches presenting simulation results on a videotape and then viewing the tape later at various controlled speeds. The Examiner further argued that simulation is solving the mathematical model of a system on a computer and producing the results. Further, the results can be presented on a display screen for the user to see or can be recorded on a videotape to play later and for analysis of the results. The Examiner then made a logical leap and stated that reliability analysis "is very similar to simulation since it uses the mathematical models to compute some values and generate the outputs. Reliability analysis produces probability charts and outputs similar to the probability charts and outputs produced by any other simulation". Office Action, page 28. Moreover, apparently because reliability analysis involves simulation, one of ordinary skill in the art would use the teachings of Goyal to record the reliability simulation outputs on a video tape and play them later in a movie mode.

Appellants respectfully submit that Goyal bears no relation to reliability or any similar conceptual analysis. On the contrary, Goyal teaches display of simulated physical objects and/or components, and the simulation of the interaction of rigid bodies. Goyal has nothing to do with reliability analysis of a system. The Examiner relates simulation or visualization to reliability analysis because of mathematics. But any type of simulation or visualization will require mathematics. *This does not mean that all types of simulation or visualization is equivalent to or can be even compared to reliability analysis*. Goyal displays parts because parts lend themselves to display, particularly their

movement in movie mode. This is not generally the case of analyses such as for reliability.

Goyal is a non-analogous art.

Appellants respectfully assert that Goyal for that matter is simply non-analogous art. For the teachings of a reference to be prior art under 35 U.S.C. § 103, there must be some basis for concluding that the reference would have been considered by one skilled in the particular art, working on the particular problem with which the invention pertains. *In re Horne*, 203 U.S.P.Q. 969, 971 (C.C.P.A. 1979). Non-analogous art cannot properly be pertinent prior art under 35 U.S.C. § 103. *In re Pagliaro*, 210 U.S.P.Q. 888, 892 (C.C.P.A. 1981). The determination of whether a reference is from a non-analogous art is set forth in a two-step test given in *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 220 U.S.P.Q. 584 (Fed. Cir. 1984). *In Union Carbide*, the court found that the first determination was whether "the reference is within the field of the inventor's endeavor." If it is not, one must proceed to the second step "to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved." In regard to the second step, *Bott v. Fourstar Corp.*, 218 U.S.P.Q. 358 (E.D. Mich. 1983) determined that "analogous art is that field of art which a person of ordinary skill in the art would have been apt to refer in attempting to solve the problem solved by a proposed invention." "To be relevant the area of art should be where one of ordinary skill in the art would be aware that similar problems exist." *Id.*

Appellants respectfully submit that one skilled in the art of reliability analysis would not contemplate a movie mode display of reliability analysis on the basis of teachings in Goyal of movie mode display of physical parts and their simulated movement. Applying the *Union Carbide* test, the display or simulation of movement of parts set forth in Goyal is certainly not in the inventors' field of endeavor. The present field of endeavor relates to reliability analysis, including consideration of many factors and assumptions as set forth in the present application. Goyal is simply not concerned at all with this area, but on the contrary relates to the physics of movement and interaction

of physical parts that can be simulated by a computer. Thus, the reference is not in the inventors' field of endeavor.

According to the second element of the *Union Carbide* test, then, it must be determined whether the reference is reasonably pertinent to the particular problem with which the inventors were involved. Appellants submit that it is not. Goyal relates, as noted above, to the physics of movement of rigid bodies, such as mechanical parts. The problem of such movement is their interaction, such as in accordance with the principles of Newtonian physics. This problem is not similar to the problems associated with understanding and conceptionalizing reliability of complex systems based upon a range of inputs and factors that can be considered in a simulation. Because the problems are so different, then, Appellants submit that the second prong of the *Union Carbide* test is simply not satisfied. Accordingly, Goyal is non-analogous art.

In summary, it is Appellants' position that the primary references cannot be combined with Goyal to arrive at the claimed invention absent reliance upon the present claims themselves. Any basis for the combination is, in Appellants' view mere conjecture on the part of the Examiner. Such is insufficient to establish a *prima facie* case of obviousness.

In view of the forgoing deficiencies in the cited art, the Examiner has failed to establish a *prima facie* case of obviousness of claims 1, 12, 25, 39, 50 and 55. These claims, and the claims depending therefrom are therefore believed to be clearly patentable over the cited combination. Thus, it is respectfully requested that the rejections of claims 1, 12, 25, 39, 50 and 55 and the claims depending therefrom under 35 U.S.C. §103(a) be reversed.

B. **Ground of Rejection No. 2:**

The Examiner rejected claims 4, 15, 19-22, 24, 28, 42 and 53 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Weinstock and Goyal and further in view of Spira.

Claims 19 and the Claims Depending Therefrom.

Independent claim 19 includes similar recitations as claims 1, 12, 25, 39, 50 and 55 and requires *movie mode display of the reliability analysis*. At least because Goyal, as discussed above, fails to teach or suggest processing the *movie mode display of the reliability analysis*, and as none of the remaining references were argued to do so, Appellants submit that a *prima facie* case of obviousness is not supported against claim 19 for rejection under 35 U.S.C. §103(a). Claim 19 and the claims depending therefrom are therefore believed to be clearly patentable over the cited combination. Thus, it is respectfully requested that the rejections of claim 19 and the claims depending therefrom under 35 U.S.C. §103(a) be reversed.

C. **Ground of Rejection No. 3:**

The Examiner rejected claims 16, 17, 23, 36, 38, 44-46, 48, 49 and 57 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Spira, Wegerich, and Weinstock and further in view of Goyal.

Claims 16 and 36 and the Claims Depending Therefrom.

Independent claims 16 and 36 include similar recitations as claims 1, 12, 25, 39, 50 and 55 and requires *movie mode display of the reliability analysis*. At least because Goyal, as discussed above, fails to teach or suggest processing the *movie mode display of the reliability analysis*, and as none of the remaining references were argued to do so, Appellants submit that a *prima facie* case of obviousness is not supported against claims 16 and 36 for rejection under 35 U.S.C. §103(a). Claims 16 and 36 and the claims depending therefrom are therefore believed to be clearly patentable over the cited

combination. Thus, it is respectfully requested that the rejections of claims 16 and 36 and the claims depending therefrom under 35 U.S.C. §103(a) be reversed.

D. **Ground of Rejection No. 4:**

The Examiner rejected claims 18 and 37 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Weinstock and further in view of Spira, Wegerich, Goyal, Gross and Cook. Claims 18 and 37 depend directly or indirectly from now allowable claim 16 and 36, and are allowable by virtue of such dependency, as well as for the subject matter they separately recite. Thus, it is respectfully requested that the rejection of claims 18 and 37 under 35 U.S.C. §103(a) be withdrawn.

E. **Ground of Rejection No. 5:**

The Examiner rejected claims 43 and 56 under 35 U.S.C. § 103(a) as being unpatentable over Willoughby in view of Spira and further in view of Wegerich and Goyal.

Claims 43 and 56 and the Claims Depending Therefrom.

Independent claims 43 and 56 include similar recitations as claims 1, 12, 25, 39, 50 and 55 and requires *movie mode display of the reliability analysis*. At least because Goyal, as discussed above, fails to teach or suggest processing the *movie mode display of the reliability analysis*, and as none of the remaining references were argued to do so, Appellants submit that a *prima facie* case of obviousness is not supported against claims 16 and 36 for rejection under 35 U.S.C. §103(a). Claims 43 and 56 and the claims depending therefrom are therefore believed to be clearly patentable over the cited combination. Thus, it is respectfully requested that the rejections of claims 43 and 56 and the claims depending therefrom under 35 U.S.C. §103(a) be reversed.

Thus, Appellants respectfully request reconsideration and allowance of all pending claims, rejected on the basis of 35 U.S.C. § 103, in view of the arguments summarized above.

Conclusion

Appellants respectfully submit that all pending claims are in condition for allowance. However, if the Examiner or Board wishes to resolve any other issues by way of a telephone conference, the Examiner or Board is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

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8. APPENDIX OF CLAIMS ON APPEAL

Listing of Claims:

The following is a listing of the claims in accordance with 37 C.F.R. §1.121.

1. An interactive graphics-based system for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising:

a processor for executing instructions;

a memory for storing instructions and data;

a display device; and

an interactive graphics-based tool, comprising:

a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation;

an interactive selection component that provides a plurality of options for analyzing the hierarchical representation;

a reliability analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a reliability analysis at any level of the hierarchical representation; and

a visualization component that provides a movie mode display of the reliability analysis.

2. The system according to claim 1, wherein the hierarchical representation generated by the hierarchical representation component takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node.

3. The system according to claim 2, wherein the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes.

4. The system according to claim 1, wherein the reliability analysis component performs at least one of a statistical analysis, reliability prediction, life cycle cost analysis, maintenance projection, and inventory forecasting.

12. A graphics-based system for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising:

a processor for executing instructions;

a memory for storing instructions and data;

a display device; and

a graphics-based tool, comprising:

means for organizing the system and the plurality of subsystems and components into a hierarchical representation;

means for providing a plurality of options for analyzing the hierarchical representation;

means, responsive to the organizing means and the providing means, for performing a reliability analysis at any level of the hierarchical representation; and

means for generating a visualization of the reliability analysis in a movie mode display.

13. The system according to claim 12, wherein the hierarchical representation generated by the organizing means takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node.

14. The system according to claim 13, wherein the plurality of options provided by the providing means comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes.

15. The system according to claim 12, wherein the reliability analysis means performs at least one of a statistical analysis, reliability prediction, life cycle cost analysis, maintenance projections, and inventory forecasting.

16. A system for performing an analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising:

a processor for executing instructions;

a memory for storing instructions and data;

a display device; and

a data repository containing a plurality of service data for the system;

an interactive data preprocessor that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection; and

an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data, the interactive graphics-based tool comprising a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation; an interactive selection component that provides a plurality of options for analyzing the hierarchical representation; a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation; and a visualization component that provides a movie mode display of the statistical analysis.

17. The system according to claim 16, further comprising an expert system that assists the interactive graphics-based tool in performing the reliability analysis.

18. The system according to claim 16, wherein the data preprocessor performs at least one of determining censoring times, filtering data and segmenting data.

19. A system for performing an analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising:

a data repository containing a plurality of service data for the system;

an interactive graphics-based tool for performing a statistical analysis on the system in accordance with the plurality of service data, the interactive graphics-based tool comprising a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation; an interactive selection component that provides a plurality of options for analyzing the hierarchical representation; a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation; and a visualization component that provides a movie mode display of the statistical analysis; and

a first computing unit configured to serve the data repository and the interactive graphics-based tool.

20. The system according to claim 19, wherein the data repository stores historical failure data for the system.

21. The system according to claim 19, further comprising a simulator that simulates the reliability of the plurality of service data in accordance with the statistical model.

22. The system according to claim 19, further comprising an expert system that assists the interactive graphics-based tool in performing the statistical analysis.

23. The system according to claim 19, further comprising a data preprocessor that preprocesses the plurality of service data.

24. The system according to claim 19, further comprising a second computing unit configured to interact with the data repository and the interactive graphics-based tool served from the first computing unit over a network.

25. A computer-implemented method for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising computer-implemented steps for:

organizing the system and the plurality of subsystems and components into a hierarchical representation;

providing a plurality of options for analyzing the hierarchical representation;

performing a reliability analysis at any level of the hierarchical representation; and

providing a visualization of the reliability analysis as a movie mode display.

26. The method according to claim 25, wherein the hierarchical representation takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by as a node.

27. The method according to claim 26, wherein the plurality of options comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes.

28. The method according to claim 25, wherein the performing a reliability analysis comprises performing at least one of a statistical analysis, reliability prediction, life cycle cost analysis, maintenance projections, and inventory forecasting.

36. A computer-implemented method for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising computer-implemented steps for:

storing a plurality of service data for the system;

preprocessing the plurality of service data in accordance with a user specified reliability analysis selection;

providing an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data, wherein the interactive graphics-based tool is configured to organize the system and the plurality of subsystems and components into a hierarchical representation, to provide a plurality of options for analyzing the hierarchical representation, and to perform a reliability analysis at any level of hierarchical representation; and

providing a visualization of the reliability analysis as a movie mode display.

37. The method according to claim 36, wherein the preprocessing comprises performing at least one of determining censoring times, filtering data and segmenting data.

38. The method according to claim 36, further comprising performing a simulation, wherein the simulating predicts life cycle events and costs associated with each event.

39. A computer-implemented method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising computer-implemented steps for:

prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation;

prompting the user to select from a plurality of analyzing options;

in response to the user selection, performing a reliability analysis at any level of the hierarchical representation; and

providing a visualization of the reliability analysis to the user in a movie mode display.

40. The method according to claim 39, wherein the hierarchical representation takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node.

41. The method according to claim 40, wherein the plurality of options comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes.

42. The method according to claim 39, wherein the performing of the reliability analysis comprises performing at least one of a statistical analysis, reliability prediction, life cycle cost analysis, maintenance projections, and inventory forecasting.

43. A computer-implemented method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising computer-implemented steps for:

storing a plurality of service data for the system:

prompting the user to specify a reliability analysis selection;

preprocessing the plurality of service data in accordance with the user specified reliability analysis selection;

performing the user specified reliability analysis; and

providing a visualization of the reliability analysis as a movie mode display.

44. The method according to claim 43, wherein the performing of the user specified reliability analysis comprises prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation.

45. The method according to claim 44, wherein the performing of the user specified reliability analysis comprises prompting the user to select from a plurality of analyzing options for analyzing the hierarchical representation.

46. The method according to claim 45, wherein the performing of the user specified reliability analysis comprises performing a reliability analysis at any level of the hierarchical representation in response to the user selection.

48. The method according to claim 43, further comprising performing a simulation.

49. The method according to claim 48, wherein the simulating predicts life cycle events and costs associated with each event.

50. A computer-readable medium storing computer instructions which when executed on a computer perform a process for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing for:

organizing the system and the plurality of subsystems and components into a hierarchical representation;

providing a plurality of options for analyzing the hierarchical representation;

performing a reliability analysis at any level of the hierarchical representation; and

visualizing the reliability analysis in a movie mode display.

51. The computer-readable medium according to claim 50, wherein the hierarchical representation takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node.

52. The computer-readable medium according to claim 51, wherein the plurality of options comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes.

53. The computer-readable medium according to claim 50, wherein the performing of the reliability analysis comprises instructions for performing at least one of a statistical analysis, reliability prediction, life cycle cost analysis, maintenance projections, and inventory forecasting.

55. A computer-readable medium storing computer instructions which when executed on a computer perform a process for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing for:

prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation;

prompting the user to select from a plurality of analyzing options;

in response to the user selection, performing a reliability analysis at any level of the hierarchical representation; and

providing a visualization of the reliability analysis to the user in a movie mode display.

56. A computer-readable medium storing computer instructions which when executed on a computer perform a process for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing for:

storing a plurality of service data for the system;

prompting the user to specify a reliability analysis selection;

preprocessing the plurality of service data in accordance with the user specified reliability analysis selection;

performing the user specified reliability analysis; and

providing a visualization of the reliability analysis as a movie mode display.

57. The computer-readable medium according to claim 56, further comprising instructions for performing a simulation.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.